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\*\*\*\*THIS IS A NEW I.M. - PLEASE READ CAREFULLY\*\*\*\*

## **METHOD OF TEST TEMPERATURE OF FRESHLY MIXED CONCRETE**

### **SCOPE**

This test method covers the determination of temperature of freshly mixed Portland Cement Concrete.

This standard may involve hazardous materials, operations, and equipment. This standard does not address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices.

### **SIGNIFICANCE AND USE**

This test method provides a means for measuring the temperature of freshly mixed concrete. It may be used to verify conformance to a specified requirement for temperature of concrete.

Concrete containing aggregate of a nominal maximum size greater than 75 mm (3 in.) may require up to 20 minutes for the transfer of heat from aggregate to mortar.

### **PROCEDURE**

#### **A. Apparatus**

1. Container. The container shall be made of nonabsorptive material and large enough to provide at least 75 mm (3 in.) of concrete in all directions around the sensor of the temperature-measuring device; the concrete cover shall also be at least three times the nominal maximum size of the coarse aggregate.
2. Temperature-measuring Device. The temperature-measuring device shall be capable of measuring the temperature of the freshly mixed concrete to  $\pm 0.5^{\circ}\text{C}$  ( $\pm 1^{\circ}\text{F}$ ) throughout the entire temperature range likely to be encountered in the fresh concrete. Liquid-in glass thermometers having a range of  $-18^{\circ}\text{C}$  to  $49^{\circ}\text{C}$  ( $0^{\circ}\text{F}$  to  $120^{\circ}\text{F}$ ) are satisfactory. Other thermometers of the required accuracy, including the metal immersion type, are acceptable.
3. Thermometer Marking. Partial-immersion liquid-in-glass thermometers (and possibly other types) shall have a permanent mark to which the device must be immersed without applying a correction factor.

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4. Reference Temperature-measuring Device. The reference temperature-measuring device shall be a liquid-in-glass thermometer readable to 0.2°C (0.5°F) that has been verified and calibrated. The calibration certificate or report indicating conformance to ASTM E77 requirements shall be available for inspection.

B. Calibration of Temperature-measuring Device

1. Each temperature-measuring device used for determining the temperature of freshly mixed concrete shall be calibrated annually, or whenever there is a question of accuracy. This calibration shall be performed by comparing the readings on the temperature-measuring device at two temperatures at least 15°C (27°F) apart.

C. Sampling Concrete

1. The temperature of freshly-mixed concrete may be measured in the transporting equipment providing the sensor of the temperature-measuring device has at least 75 mm (3 in.) of concrete cover in all directions around it.
2. If the transporting equipment is not used as the container, a sample shall be prepared as follows:
  - a. Immediately prior to sampling the freshly mixed concrete, dampen (with water) the sample container.
  - b. Sample the freshly mixed concrete in accordance with [I.M. 327](#).
  - c. Place the freshly mixed concrete into the container. (**NOTE:** When concrete contains a nominal maximum size of aggregate greater than 75 mm (3 in.), it may require 20 minutes after mixing before the temperature is stabilized.)
  - d. Complete the temperature measurement of the freshly mixed concrete within five minutes after obtaining the sample.

D. Test Procedure

1. Place the temperature-measuring device in the freshly mixed concrete, so the temperature-sensing portion is submerged in a minimum of 75 mm (3 in.) of concrete. Gently press the concrete around the temperature-measuring device at the surface of the concrete so the ambient air temperature does not affect the reading.
  2. Leave the temperature-measuring device in the freshly mixed concrete for a minimum period of two minutes or until the temperature reading stabilizes, then read and record the temperature.
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3. Complete the temperature measurement of the freshly mixed concrete within five minutes of obtaining the sample.
  4. Record the measured temperature of the freshly mixed concrete to the nearest 0.5°C (1°F).